

IR-Lumineszenzdiode (940 nm) mit hoher Ausgangsleistung

High Power Infrared Emitter (940 nm)

Lead (Pb) Free Product - RoHS Compliant

SFH 4246



Wesentliche Merkmale

- Infrarot LED mit hoher Ausgangsleistung
- Kurze Schaltzeiten

Anwendungen

- IR-Datenübertragung
- Analoge und digitale Hi-Fi Audio- und Videosignalübertragung
- Anwendungen mit hohen Zuverlässigkeitsansprüchen bzw. erhöhten Anforderungen
- Alarm- und Sicherungssysteme

Sicherheitshinweise

Je nach Betriebsart emittieren diese Bauteile hochkonzentrierte, nicht sichtbare Infrarot-Strahlung, die gefährlich für das menschliche Auge sein kann. Produkte, die diese Bauteile enthalten, müssen gemäß den Sicherheitsrichtlinien der IEC-Normen 60825-1 und 62471 behandelt werden.

Features

- High Power Infrared LED
- Short switching times

Applications

- IR Data Transmission
- Analog and digital Hi-Fi audio and video signal transmission
- Suitable for professional and high-reliability applications
- Alarm and safety equipment

Safety Advises

Depending on the mode of operation, these devices emit highly concentrated non visible infrared light which can be hazardous to the human eye. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1 and IEC 62471.

Type Type	Bestellnummer Ordering Code	Strahlstärkegruppierung ¹⁾ ($I_F = 70 \text{ mA}$, $t_p = 20 \text{ ms}$) Radiant Intensity Grouping ¹⁾ $I_e \text{ (mW/sr)}$
SFH 4246	Q65110A8100	$\geq 10 \text{ (typ. 30)}$

¹⁾ gemessen bei einem Raumwinkel $\Omega = 0.01$ / measured at a solid angle of $\Omega = 0.01 \text{ sr}$

Grenzwerte ($T_A = 25\text{ °C}$)**Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebs- und Lagertemperatur Operating and storage temperature range	T_{op}, T_{stg}	- 40 ... + 100	°C
Sperrspannung Reverse voltage	V_R	5	V
Vorwärtsgleichstrom Forward current	I_F	70	mA
Stoßstrom, $t_p = 100\text{ }\mu\text{s}$, $D = 0$ Surge current	I_{FSM}	700	mA
Verlustleistung Power dissipation	P_{tot}	140	mW
Wärmewiderstand Sperrschicht - Umgebung bei Montage auf FR4 Platine, Padgröße je 16 mm ² Thermal resistance junction - ambient mounted on PC-board (FR4), padsize 16 mm ² each	R_{thJA}	500	K/W
Wärmewiderstand Sperrschicht - Lötstelle bei Montage auf Metall-Block Thermal resistance junction - soldering point, mounted on metal block	R_{thJS}	280	K/W

Kennwerte ($T_A = 25\text{ °C}$)**Characteristics**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der Strahlung Wavelength at peak emission $I_F = 70\text{ mA}$	λ_{peak}	950	nm
Centroid-Wellenlänge der Strahlung Centroid wavelength $I_F = 70\text{ mA}$	$\lambda_{centroid}$	940	nm
Spektrale Bandbreite bei 50% von I_{max} Spectral bandwidth at 50% of I_{max} $I_F = 70\text{ mA}$	$\Delta\lambda$	42	nm
Abstrahlwinkel Half angle	φ	± 30	Grad deg.
Aktive Chipfläche Active chip area	A	0.04	mm ²

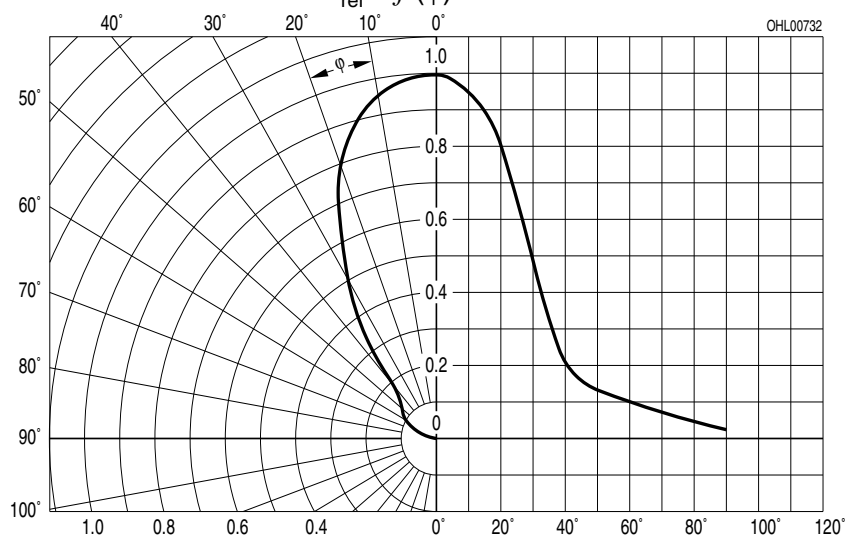
Kennwerte ($T_A = 25\text{ °C}$)**Characteristics** (cont'd)

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Abmessungen der aktiven Chipfläche Dimension of the active chip area	$L \times B$ $L \times W$	0.2×0.2	mm ²
Schaltzeiten, I_e von 10% auf 90% und von 90% auf 10%, bei $I_F = 70\text{ mA}$, $R_L = 50\ \Omega$ Switching times, I_e from 10% to 90% and from 90% to 10%, $I_F = 70\text{ mA}$, $R_L = 50\ \Omega$	t_r, t_f	11	ns
Durchlassspannung Forward voltage $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$ $I_F = 500\text{ mA}$, $t_p = 100\ \mu\text{s}$	V_F V_F	1.6 (< 2.0) 2.4 (< 3.0)	V V
Sperrstrom Reverse current	I_R	not designed for reverse operation	μA
Gesamtstrahlungsfluss Total radiant flux $I_F = 70\text{ mA}$, $t_p = 20\text{ ms}$	$\Phi_{e\text{ typ}}$	35	mW
Temperaturkoeffizient von I_e bzw. Φ_e , $I_F = 70\text{ mA}$ Temperature coefficient of I_e or Φ_e , $I_F = 70\text{ mA}$	TC_I	- 0.5	%/K
Temperaturkoeffizient von V_F , $I_F = 70\text{ mA}$ Temperature coefficient of V_F , $I_F = 70\text{ mA}$	TC_V	- 3.5	mV/K
Temperaturkoeffizient von λ , $I_F = 70\text{ mA}$ Temperature coefficient of λ , $I_F = 70\text{ mA}$	TC_λ	+ 0.3	nm/K

Strahlstärke I_e in Achsrichtung¹⁾gemessen bei einem Raumwinkel $\Omega = 0.01$ sr**Radiant Intensity I_e in Axial Direction**at a solid angle of $\Omega = 0.01$ sr

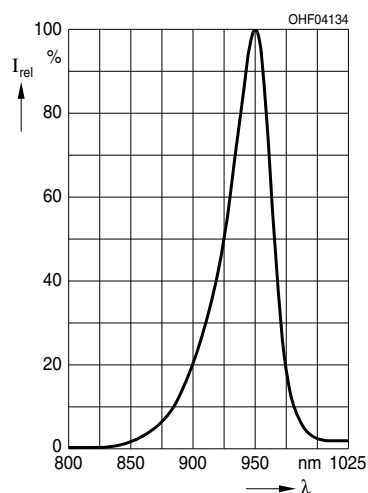
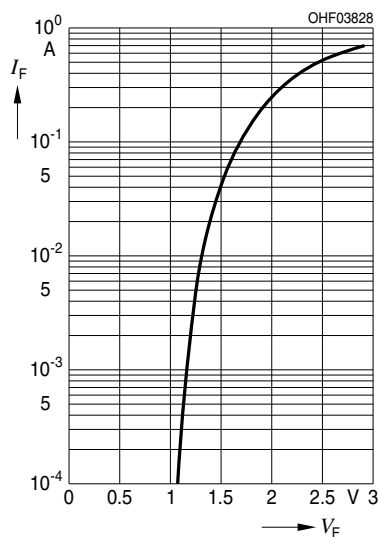
Bezeichnung Parameter	Symbol	Werte Values			Einheit Unit
		SFH 4246-R	SFH 4246-S	SFH 4246-T	
Strahlstärke Radiant intensity $I_F = 70$ mA, $t_p = 20$ ms	$I_{e \min}$ $I_{e \max}$	10 20	16 32	25 50	mW/sr mW/sr
Strahlstärke Radiant intensity $I_F = 500$ mA, $t_p = 25$ μ s	$I_{e \text{ typ}}$	75	120	185	mW/sr

¹⁾ Nur eine Gruppe in einer Verpackungseinheit (Streuung kleiner 2:1) /
Only one bin in one packing unit (variation lower 2:1)

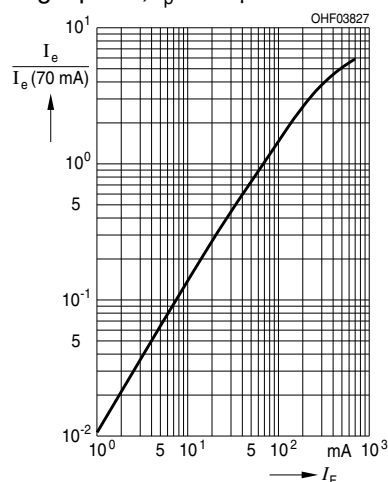
Abstrahlcharakteristik**Radiation Characteristics $I_{\text{rel}} = f(\varphi)$** 

Relative Spectral Emission

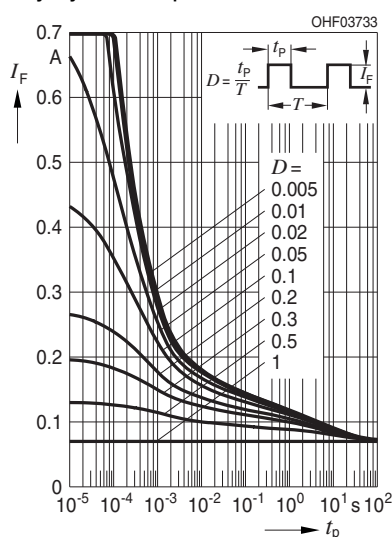
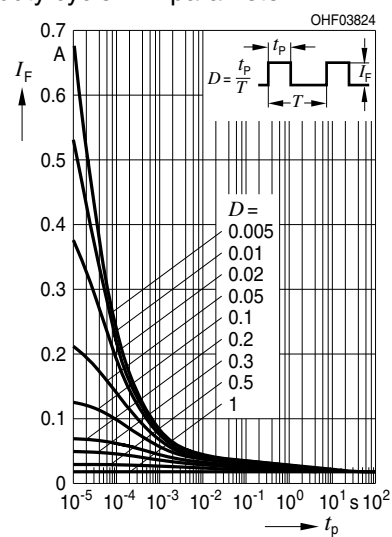
$$I_{\text{rel}} = f(\lambda)$$

**Forward Current $I_F = f(V_F)$** Single pulse, $t_p = 100 \mu\text{s}$ 

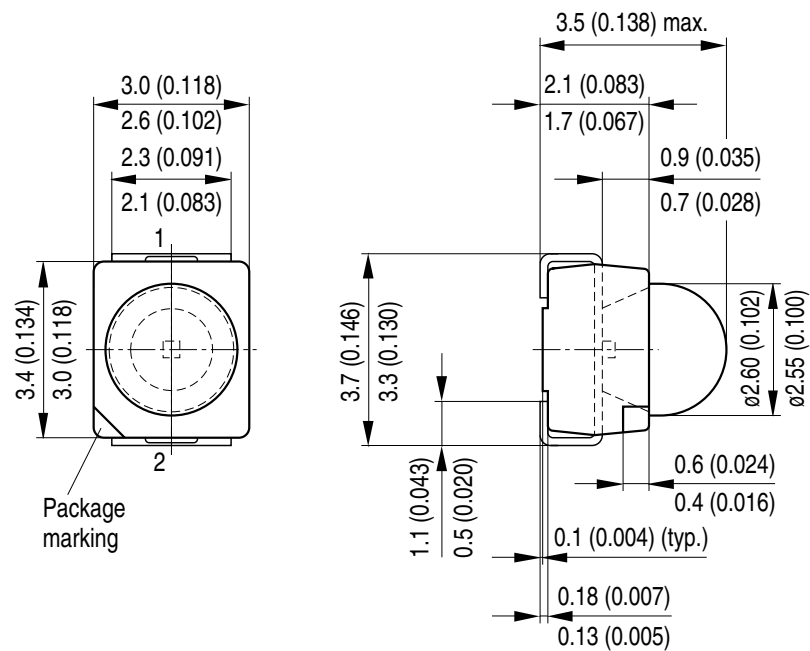
$$\text{Radiant Intensity } \frac{I_e}{I_e(70 \text{ mA})} = f(I_F)$$

Single pulse, $t_p = 25 \mu\text{s}$ **Max. Permissible Forward Current**

$$I_F = f(T_A), R_{\text{thJA}} = 500 \text{ K/W}$$

**Permissible Pulse Handling**
 $I_F = f(\tau), T_A = 25^\circ\text{C}$,
duty cycle $D = \text{parameter}$
**Permissible Pulse Handling**
 $I_F = f(\tau), T_A = 85^\circ\text{C}$,
duty cycle $D = \text{parameter}$


Maßzeichnung **Package Outlines**

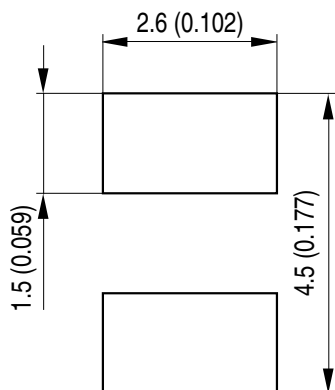


Maße in mm (inch) / Dimensions in mm (inch).

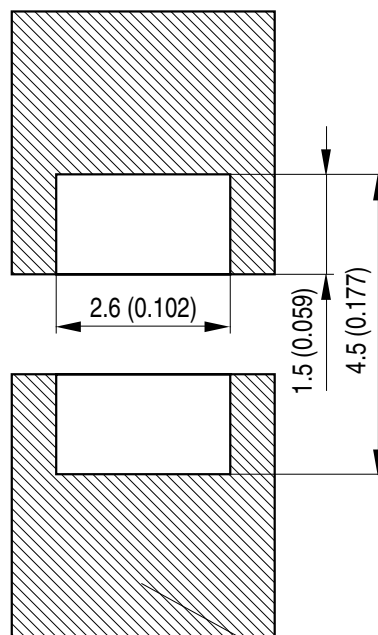
Gehäuse / Package	TOPLED® mit Linse (P-LCC-2) / TOPLED® with lens (P-LCC-2)
Anschlussbelegung pin configuration	1 = Anode / anode 2 = Kathode / cathode
Farbe Color	weiß white

Empfohlenes Lötpaddesign Recommended Solder Pad

Reflow Löten Reflow Soldering



Padgeometrie für
verbesserte Wärmeableitung
Pad design for
improved heat dissipation



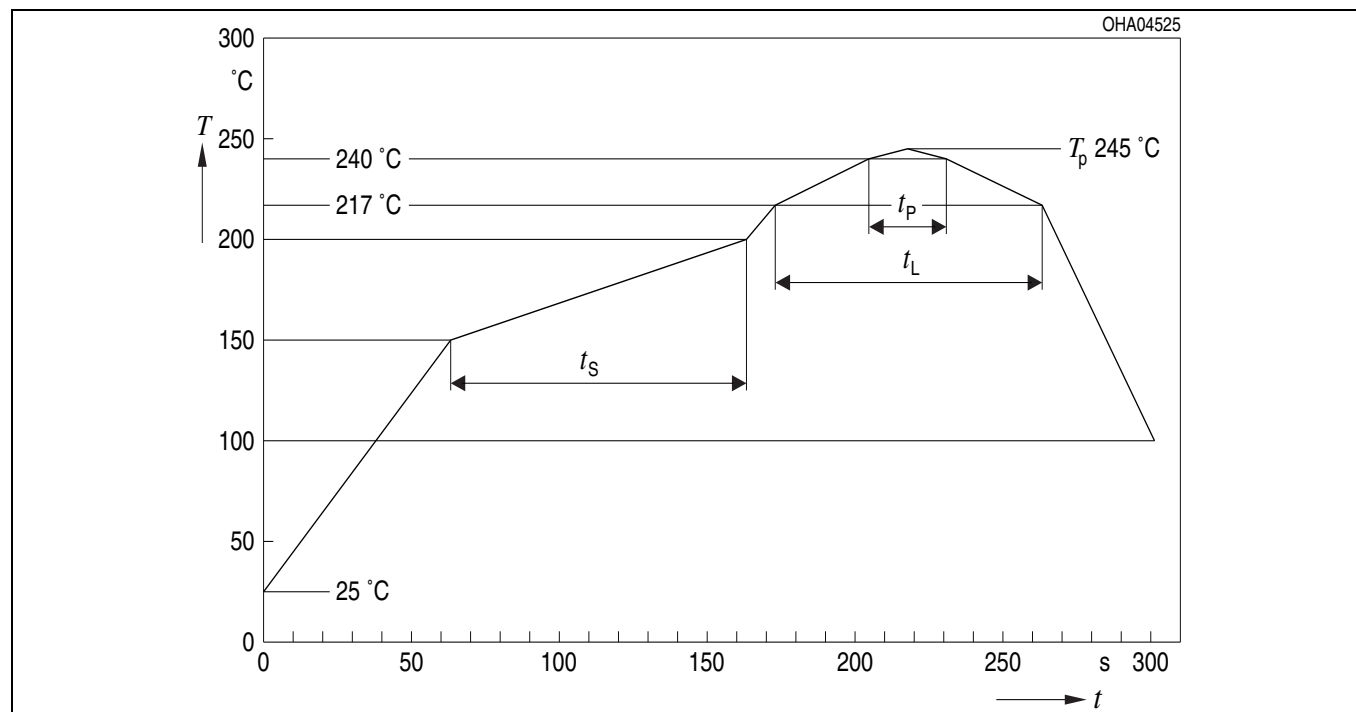
 Lötstopplack
Solder resist

Cu-Fläche > 16 mm²
Cu-area > 16 mm²

OHLPY970

Lötbedingungen
Soldering Conditions
Reflow Lötprofil für bleifreies Löten
Reflow Soldering Profile for lead free soldering

Vorbehandlung nach JEDEC Level 2
 Preconditioning acc. to JEDEC Level 2
 (nach J-STD-020D.01)
 (acc. to J-STD-020D.01)



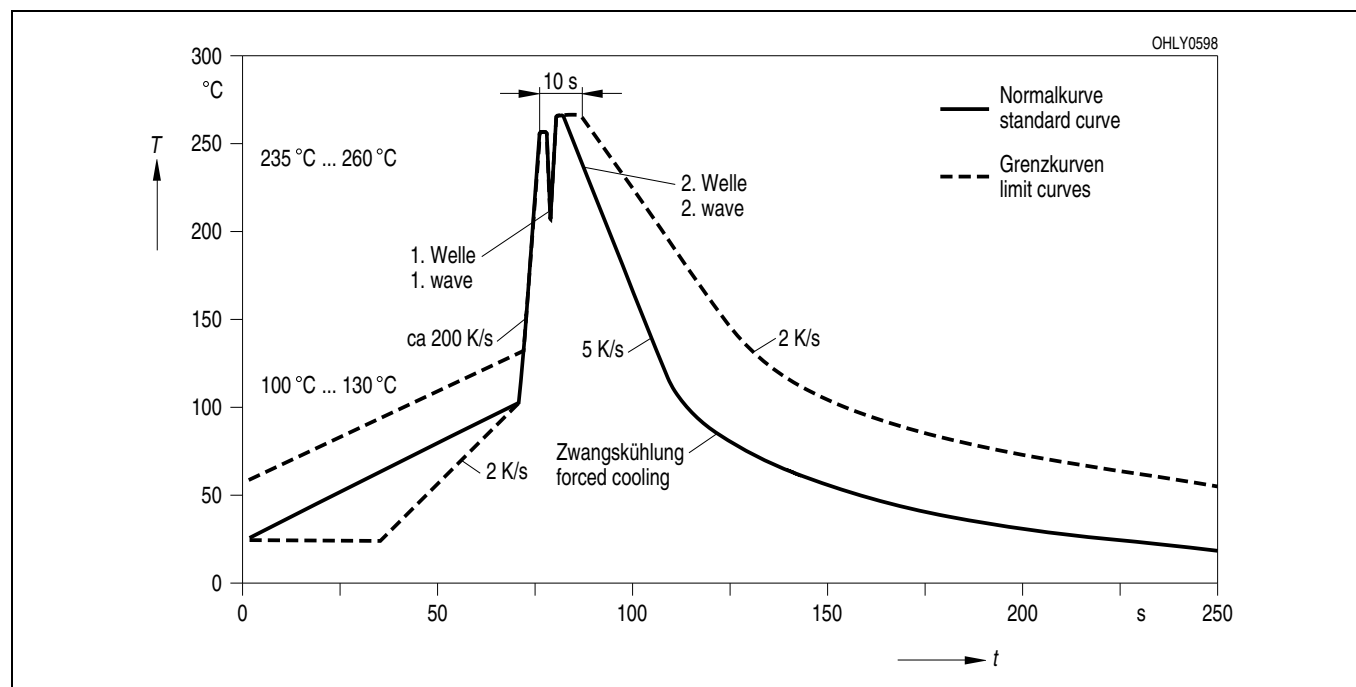
Profileigenschaften Profile Feature	Bleifreier Aufbau / Pb-Free Assembly (SnAgCu)	
	Empfehlung / Recommendation	Grenzwerte / Max. Ratings
Aufheizrate zum Vorwärmen*) / Ramp-up rate to preheat*) 25 °C to 150 °C	2 K / s	3 K / s
Zeit ts von T _{Smin} bis T _{Smax} / Time ts from T _{Smin} to T _{Smax} 150 °C to 200 °C	100 s	min. 60 s max. 120 s
Aufheizrate zur Spitzentemperatur*) / Ramp-up rate to peak*) 180 °C to Tp	2 K / s	3 K / s
Liquidustemperatur TL / Liquidus temperature TL	217 °C	
Zeit tL über TL / Time tL above TL	80 s	max. 100 s
Spitzentemperatur Tp / Peak temperature Tp	245 °C	max. 250 °C
Verweilzeit tp innerhalb des spezifizierten Spitzentemperaturbereichs Tp - 5 K / Time tp within the specified peak temperature range Tp - 5 K	20 s	min. 10 s max. 30 s
Abkühlrate*) / Ramp-down rate*) Tp to 100 °C	3 K / s	4 K / s maximum
Zeitspanne von 25 °C bis zur Spitzentemperatur / Time from 25 °C to peak temperature		max. 8 min.

Alle Temperaturen beziehen sich auf die Bauteilmitte, jeweils auf der Bauteiloberseite gemessen / All temperatures refer to the center of the package, measured on the top of the package

* Steigungsberechnung $\Delta T / \Delta t$: Δt max. 5 s; erfüllt über den gesamten Temperaturbereich / slope calculation $\Delta T / \Delta t$: Δt max. 5 s; fulfillment for the whole T-range

Wellenlötten (TTW) TTW Soldering

(nach CECC 00802)
(acc. to CECC 00802)



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Components used in life-support devices or systems must be expressly authorized for such purpose! Critical components¹, may only be used in life-support devices or systems² with the express written approval of OSRAM OS.

¹ A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

² Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered.